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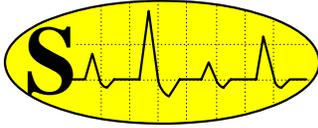
Si50NeUdMC1-120V-32A, Single Channel, **120V 32A**, Open-Loop, Networkable, Unidirectional Motor Controller with Integrated Heat Sink, 6.25kHz or 25kHz PWM, T-Chip

The **Si50NeUdMC1-120V-32A** is a 120V, 32A, microprocessor based, Single, Open-Loop, Networkable, Unidirectional, Motor-Controller board that uses 6.25kHz or 25kHz pulse-width modulation (**PWM**) to efficiently control the speed of a brush type DC motor (or load current) in the 0 to 3840W power range, and in 32W steps. An onboard microprocessor generates a 6.25kHz or 25kHz **PWM** carrier signal, controls the load-power (or motor speed), controls the load-current rate (or motor acceleration and deceleration), updates the display, monitors the user inputs and controls the RS232 Network Port. The **PWM** carrier frequency is user selectable by the jumper **CN4**, 25kHz when **CN4** is open and 6.25kHz when short. The high frequency PWM rate provides a smooth speed control and provides a quiet motor environment. As the name (**Ne, Networkable**) implies, the desired motor speed (or PWM duty-cycle) is acquired from an RS232 port; and duty-cycle is variable from 0 to + or -100% in 0.83% steps. The Local Area Network (**LAN**) and the RS232 Protocol is described below. A normally open switch (or an Open Collector npn Transistor) can be connected to jumper **J1** (as shown below), **J1** Open=Normal operation, **J1** Short=Load is open. The active pin on **J1** is pulled to +5V through a 4.7k Ohm resistor, while the other pin (G) is at ground. The user can choose between slow or fast motor acceleration/deceleration modes by short-circuiting or open-circuiting the pins labeled **J2**. The slow mode, with rise-time/fall-time of 0.5s, is selected by short-circuit (**J2** jumper installed); while the fast buildup mode, with rise-time/fall-time of 0.025s, is selected by leaving these pins open (no Jumper installed). An LCD port (with 9600 Baud RS232 Interface Standard) is provided for display of the Set and Measured temperature data. The LCD can be order Signal under the part number of [Si14LCD2L16CH-3PC](#) (2-Line by 16-Char display with 12" cable and 3-pin connectors, and with back-light). An onboard LED (red) is used to monitor the load-voltage. A small (3.0"x4.0"x1.0") finned heat-sink is provided to operate 1500W power level (or at 120V and 32A) Higher current level levels (50A at 120V or 6000W) can be achieved with more efficient heat-sinks (4.0" x 3.7" x 0.5" finned heat sink). This board requires a single 35V to 120V DC unregulated power source at a 0A to 32A current range to operate normally. Typical applications are: DC Motor-Speed Controller, Light-Dimmer with variable delay, Power Amplifier, SPST Solid State Relay, etc. This board can be configured and programmed to perform efficiently in many customized applications.



Specification and Application for **Si50NeUdMC1-120V-35A**

- **Typical Operating Temperature at 35A and 6.25kHz:** 45°C with MOSFETs bolted to a small (4.0"x3.7"x0.5") finned heat-sink, while the fins are exposed to air at 25°C (as shown on photo).
- **Overall Dimensions:** Length=4.0", Width=3.7", Height=1.95" Inches, (L=100, W=93, H=50 mm).
- **Absolute Maximum Source-Voltage, V_P (from pin +P to pin- P):** 140V_{peak}
- **Typical Source-Voltage Requirement (V_P from pin +P to pin -P):** Any DC voltage from 45V to 120V, unregulated DC.
- **Average Load-Voltage:** Linearly variable from 0 to V_P in 0.83% steps, using the **RS232** input.
- **Average Load-Current:** 0A at 0% duty-cycle and 50A max. at 100% duty-cycle.
- **Load Isolation:** The load or motor must be isolated from the ground.
- **Power-Conversion Efficiency:** Approximately 98.5% at full-load (120V and 32A).
- **PWM Switching Frequency:** 6.25kHz when **CN4** short and 25kHz when **CN4** open.



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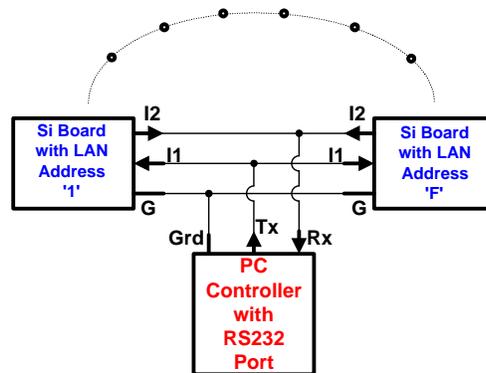
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Command Format and Local Area Network (LAN) for the **Si50NeUdMC1-120V-32A**

Each board has a unique, 8-bit, ASCII, **none-volatile**, Node-Address ranging from 1....9, A..Z, a,...z (or a total of 61 Units can be networked). The address can be changed by a **LAN** command (the factory default address is 1). The board uses a modified version of the RS232 serial-data communication standard, where the output-voltage (on pin **I2**, **CN5**) ranges from 0 to +5V (rather than the usual -12V to +12V). In addition, this output pin is normally an open circuit and it will only output a serial TTL binary bit-stream when properly referenced by its Node-Address. The serial data input-voltage (on pin **I1**, **CN5**) has the standard range of -12V to +12V. The serial data-format is: 9600 Baud Rate, 1 Start-Bit, 8 Data-Bits, 1 Stop-Bit, and no Parity-Bit.

These features allow the creation of a Local Area Network (**LAN**) with up to 61 nodes (boards). A typical 3-wire **LAN** with "Star Topology" is shown below. Note that the control lines (**G**, **I1**, **I2**) with the same name are connected together (or the boards are connected in parallel) and driven by an **ASCII** controller (or **PC**), equipped with an RS232 serial port, operating at 9600 Baud rate.



Command Rules:

1. All Commands are **ASCII** character strings (Chars.). An ASCII string is denoted here with **Bold Red Letters (Characters)**.
2. Each string is terminated by a Carriage Return Character, **(CR)**. The only exception is the **#** command.
3. Upper-Case Letters are used for Output Commands; and Lower-Case Letters are used for Input Commands.
4. The 1st Char. in a string is either ASCII **#** or a Node Address (**1, ..,9,A..Z, a,...,z**). If the 1st Char. is an **#**, it denotes a query to all boards on the LAN to output their Node Address and Program Name.
5. If the 1st Char. is an ASCII (**1..,9,A,..Z, a,...,z**), it directs the rest of the command string to the board that has this address.
6. The 2nd Char. in the string is the Command Character that operates on the addressed board.
7. The 3rd, 4th, 5th Chars. represents the value of the input data.
8. The last Char. in the sequence is always the string terminator, **(CR)**.



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Command Examples:

Ex#1. Com. String: **#** Action: All boards on the LAN will output their Address and Program Name.

Ex#2. Com. String: **1u5(CR)** Action: Change Board 1 Address in EPROM from 1 to 5.

Ex#3. Com. String: **1M(CR)** Action: Board 1 outputs its Set and Measured Values (0,..120).

Ex#4. Com. String: **1m120(CR)** Action: Change Board 1 Load Value to 120 = 100% PWM.

Ex#5. Com. String: **2m60(CR)** Action: Change Board 2 Motor Value to 60 = 50% PWM.

We recommend that you use approximately 25msec (or longer) delays between characters when inputting a command string ("1m..(CR)", "1M(CR)") to this controller board.

Occasionally, a transient character may be captured and buffered by one more board on the LAN, this **transient character can be cleared by sending one or more (CR) prior to a valid command string.**

Note1: The **m** command inputs decimal integer Motor Values, ranging from 0,...+120. The positive values are used for forward speed control. The PWM duty-cycle varies linearly with the input values; 0 value is equal to 0% PWM, while 120 value is equal to 100% PWM.

Note2: The **m** command is **NOT** subject to round-off" errors!!!

Note3: The last set value entered with the **m** command or with the Up/Down keys is saved when the power is turned off, and this value is restored when the power is turned back on.

Response to Commands on Output Line I2:

The response to a "**1M(CR)**" command is an ASCII character string (or a line of characters). Each string is terminated with carriage return and line feed characters. An example is shown below:

N=1 SM=120 MM=120

Note that there are two space characters between **1** and **S**; and there are two space characters between **C** and **M**. The length of this character string is 22, including carriage return and line feed characters (not shown in this example). Where **N=1** is the node (or unit) address of the board (can be changed with the **u** command), **SM=120** is the last Set-Motor Speed Value (entered with the **m** command), and **MM=120** is the current Measured-Motor Speed Value.

Each character string (line) is a continuous stream of ASCII characters with an occasional pause (or delay) between characters. This delay is approximately 1msec. **The on-board microprocessor provides the bus arbitration, required to avoid data collisions on the 3-wire LAN bus.**

Network Configuration: The **Si..Ne..** boards can be arranged in many Local Area Network (LAN) topologies: Star, Daisy-Chain, etc. You may create your own network or you may order one or more of the Network Cable Assemblies listed in the Application Note. **Before you build a network, we recommend that you click on this blue link and read this Application Note: [SigNote on Configuring a LAN-2](#) .**